CLAIMS

1. A system for use with a surface, the system comprising:

a plurality of receiver assemblies comprising a first ultrasound receiver located adjacent to the surface, and a second ultrasound receiver displaced from the first ultrasound receiver in a direction substantially perpendicular to the surface, the first and second ultrasound receivers being connected to generate a total output signal corresponding to the instantaneous sum of the ultrasound signals received at each of the first and second ultrasound receivers;

an attachable strip, wherein the plurality of receiver assemblies are mounted to the strip; and

a movable transmitter device comprising an ultrasound transmitter.

2. The system of Claim 1, further comprising:

an infrared receiver mounted on the strip; and

wherein the movable transmitter device further comprises an infrared transmitter.

3. The system of Claim 1, wherein the movable transmitter device further comprises:

a housing comprising a substantially cylindrical opening terminating at a first end comprising an inner housing surface having a central bore, the housing receiving a portion of a drawing implement that comprises a body, a back end, a front end opposite the back end, and an operative tip that extends through the central bore,

a retainer attachable to a second end of the opening to retain the drawing implement within the housing, the retainer having a spring element for biasing the drawing implement towards the inner housing surface; and

wherein the ultrasound transmitter is mounted relative to the housing proximal towards the central bore.

4. The system of Claim 3, wherein the ultrasound transmitter is a substantially cylindrical piezoelectric transmitter attached to the housing around the central bore.

5. The system of Claim 3, wherein the housing further comprises:

a microswitch actuated by changes in pressure exerted on the surface so as to be responsive to a force exerted on the operative tip of the drawing implement towards the housing; and

electronic circuitry responsive to the microswitch to affect operation of the ultrasonic transmitter at least when the microswitch indicates a force exerted on the operative tip of the drawing implement towards the housing.

6. A process for use with a surface, the process comprising:

providing at least three ultrasound receivers associated with the surface;

transmitting an ultrasound signal from an element movable relative to the surface;

receiving the ultrasound signal at the plurality of ultrasound receivers; and

analyzing outputs from the ultrasound receivers comprising the step of identifying as a current position a weighted centroid of at least a first calculated position derived from the outputs of a first pair of the receivers and a second calculated position derived from the outputs of a second pair of receivers, wherein the weighting varies as a function of approximate position relative to the ultrasound receivers.

7. The process of Claim 6, further comprising transmitting an infrared signal from the element.

8. The process of Claim 7, wherein the infrared signal comprises synchronization information.

9. The process of Claim 7, wherein the infrared signal comprises pen color information.

10. The process of claim 6, wherein the ultrasound receivers are substantially collinear, and wherein the weighting varies linearly with distance in the direction of alignment of the ultrasound receivers over at least a given switch-over zone.

11. A digitizer system for digitizing operative strokes of a drawing implement comprising a body, a back end, and a front end opposite the back end against a board, the system comprising:

a movable transmitter device comprising a housing and a central bore, the central bore receiving a portion of the body of the drawing implement with its operative tip extending through the central bore, and an ultrasound transmitter mounted relative to the housing proximal central bore;

at least two ultrasound receivers mounted relative to the board for receiving air-borne ultrasound signals;

a transducer associated with the board to detect vibrations from the transmitter device conducted through the board; and

a processor responsive to outputs from the at least two ultrasound receivers to calculate a current position of the transmitter, the processor being additionally responsive to an output from the transducer to identify contact between the drawing implement and the board, thereby identifying operative strokes of the drawing implement.

12. A system for digitizing operative strokes of a drawing implement comprising a body, a back end, and a front end opposite the back end comprising an operative tip, the system comprising:

at least one ultrasound receiver assembly;

a housing comprising a substantially cylindrical opening terminating at a first end, and an inner housing surface having a central bore, the housing receiving a portion of the drawing implement, the operative tip extending through the central bore;

a retainer attachable to a second end of the opening to retain the drawing implement within the housing, the retainer having a spring element for biasing the drawing implement towards the inner housing surface; and

an ultrasound transmitter mounted relative to the housing proximal the central bore.

13. The system of Claim 12, wherein the transmitter is a substantially cylindrical piezoelectric transmitter attached to the housing around the central bore.

14. The system of Claim 12, wherein the housing further comprises:

a microswitch actuated by changes in pressure exerted on the surface to be responsive to a force exerted on the operative tip of the drawing implement towards the housing; and

electronic circuitry responsive to the microswitch to affect operation of the ultrasonic transmitter at least when the microswitch indicates a force exerted on the operative tip of the drawing implement towards the housing.

15. The system of claim 14, wherein the electronic circuitry operates the transmitter for a given time interval after the microswitch ceases to indicate a force exerted on the outer housing towards the operative tip.

16. The system of claim 14, wherein the transmitter transmits continuously, and wherein the electronic circuitry is responsive to the microswitch to change a signal transmitted by the transmitter while the microswitch indicates a force exerted on the operative tip of the drawing implement towards the housing.

17. The system of claim 14, wherein the ultrasound transmitter comprises a piezoelectric ultrasound transmitter.

18. A system for digitizing the position of a drawing implement in relation to a presentation board, the drawing implement comprising a central axis and an operative tip, the system comprising:

at least one receiver assembly; and

a transmitter device comprising a substantially cylindrical piezoelectric transmitter element positioned coaxially with the drawing implement so as to circumscribe a part of the drawing implement proximal to the operative tip.

19. The system of Claim 18, further comprising:

an eraser device comprising a handle, an eraser element comprising a substantially flat eraser surface, and a pivot joint connecting between the handle and the eraser element, the pivot joint having two degrees of rotational freedom such that, in use, the eraser element assumes an orientation with the eraser surface parallel to the presentation board substantially independent of the orientation at which the handle is held.

20. The system of Claim 18, further comprising:

a narrow-band eraser device comprising a handle, an eraser element having a substantially flat eraser surface, and a plurality of contact microswitches located on the eraser surface, such that when a portion of the eraser surface contacts the presentation board, at least one microswitch corresponding to the portion is activated and such that when substantially an entirety of the eraser surface contacts the presentation board, substantially all of the microswitches are activated.